CLAIMS

What is claimed is:

1. A method of controlling supply power provided to a power amplifier to prevent loop saturation, the method comprising the steps of:

detecting the voltage level of a supply source;

detecting the voltage level of a supply voltage to the power amplifier provided from the supply source through a pass transistor, the pass transistor having a control input;

comparing the voltage level of the supply source to a first threshold value;

if the voltage level of the supply source is above the first threshold value, comparing the voltage level of the supply voltage to the power amplifier to the voltage level of the supply source; and

based on the comparison of the voltage level of the supply to the power amplifier and the voltage level of the supply source, adjust a voltage level of a control signal provided to the control input of the pass transistor.

2. The method of claim 1, further comprising the step of detecting a temperature level of the power amplifier and the step of adjusting the voltage level of the control signal further comprises adjusting the voltage level based on the temperature level of the power amplifier.

3. A method of controlling power provided to a power amplifier to prevent loop saturation, the method comprising the steps of:

characterizing the resistance of a pass transistor over a voltage range, the pass transistor providing an electrical path from a power source to a supply power input of the power amplifier and a control input;

detecting the voltage level of the power source;

detecting the voltage level of the supply power input of the power amplifier;

calculating the level of current being provided to the power amplifier based on the voltage level of the supply power source, the voltage level of the supply power input to the power amplifier and the characteristics of the resistance of the pass transistor;

if the level of current being provided to the power amplifier exceeds a threshold value, adjusting the voltage level provided to the control input of the pass transistor, whereby the current provided to the power amplifier is decreased.

4. The method of claim 3, further comprising the step of detecting a temperature level of the power amplifier and the step of adjusting the voltage level of the control signal further comprises adjusting the voltage level based on the temperature level of the power amplifier.

5. The method of claim 4, wherein the step of characterizing the resistance of the pass transistor further comprises creating a look-up table that associates various voltages and temperature levels with various resistances.

6. The method of claim 3, wherein the step of characterizing the resistance of the pass transistor further comprises creating a look-up table that associates various voltages with various resistances.

7. A circuit for controlling the power provided to a power amplifier to prevent loop saturation, the circuit comprising:

a pass transistor, a voltage comparator, and a processor,

the pass transistor having a output, an input and a control input, the input being coupled to a supply power source, the output being coupled to the supply power input of the power amplifier and the control input receiving a first comparison signal from the integrator;

the integrator having a control voltage input, a feed back input and a comparison output, the control voltage input being coupled to a first control output from the processor, the feed back input being coupled to the output of the pass transistor through a feed back circuit and the comparison output being coupled to the control input of the pass transistor;

the processor having a first voltage sensor coupled to the supply power source, a second voltage sensor coupled to the supply power input of the power amplifier and a control voltage output coupled to the voltage control input of the integrator, the processor being operative to control the supply power to the power amplifier by:

comparing the voltage level of the supply power source and the voltage level of the supply power input to the power amplifier; and

adjusting the voltage control output based at least in part on the results of this comparison.

8. The circuit of claim 7, wherein the processor is further operative to determine the resistance of the pass transistor and the step of adjusting the voltage control output is further based on the value of the resistance.

9. The circuit of claim 8, wherein the processor is operative to determine the resistance of the pass transistor by performing a lookup function in a table stored in a memory accessible to the processor that includes a correlation of resistant values with voltage levels.

10. The circuit of claim 8, wherein the processor is operative to calculate the resistance of the pass transistor based at least in part on the value of the voltage level of the supply power source.

11. The circuit of claim 8, wherein the processor is operative to calculate the resistance of the pass transistor based at least in part on the value of the supply voltage level being provided to the power amplifier.

12. The circuit of claim 8, wherein the processor is operative to calculate the resistance of the pass transistor based at least in part on the voltage level of the supply power source and the supply voltage level being provided to the power amplifier.

13. The circuit of claim 8, wherein the processor is operative to determine the value of the current being provided to the power amplifier by dividing the difference in the voltage level of the supply power source and the supply voltage level being provided to the power amplifier by the resistance and the step of adjusting the voltage control output is based on the value of the current.

14. The circuit of claim 13, wherein the voltage control output is adjusted if the value of the current exceeds a threshold value.

15. The circuit of claim 14, further comprising a temperature sensor with a temperature value output that is coupled to a temperature input of the processor, and the processor is operative to adjust the voltage control output further based on the value of the temperature sensor input.

16. A circuit for controlling the supply power provided to a power amplifier to prevent loop saturation, the apparatus comprising:

a pass transistor having an input, an output and a control input, the input being coupled to a supply power source, the output being coupled to the supply power input of the power amplifier and the control input receiving a first control signal from a first integrator;

the first integrator have a first control voltage input, a feed back input and a first comparison output, the first control voltage input being coupled to a first control output from a processor, the feed back input being coupled to the output of the pass transistor

through a feed back circuit and the first comparison output being coupled to the input control of the pass transistor;

a second integrator having a second control voltage input, a third control voltage input and an second comparison output, the second control voltage input being coupled to a second control output from the processor, the third control input being coupled to the first comparison output of the first integrator and the second comparison output being coupled to a comparison input of the processor; and

the processor being operative to control the voltage level being provided to the power amplifier through the pass transistor by adjusting the level of the first control output and the second control output based at least in part on the level of the comparison input.

17. The circuit of claim 16, further comprising a temperature sensor with a temperature value output that is coupled to a temperature input of the processor, and the processor is operative to adjust the voltage level being provided to the power amplifier through the pass transistor further based on the value of the temperature sensor input.

18. A mobile station for use in a cellular system, the mobile station comprising:

a power amplifier having a power input, a pass transistor, a integrator, and a processor,

the pass transistor having an output, an input and a control input, the input being coupled to a supply power source, the output being coupled to the supply power input of the power amplifier and the control input receiving a first comparison signal from the integrator;

the integrator having a control voltage input, a feed back input and a comparison output, the control voltage input being coupled to a first control output from the processor, the feed back input being coupled to the output of the pass transistor through a feed back circuit and the comparison output being coupled to the control input of the pass transistor;

the processor having a first voltage sensor coupled to the power source, a second voltage sensor coupled to the power input of the power amplifier and a control voltage output coupled to the voltage control input of the voltage comparator, the processor being operative to control the supply power to the power amplifier by:

comparing the voltage level of the supply power source and the voltage level of the supply power input to the power amplifier; and

adjusting the voltage control output based at least in part on the results of this comparison.